

Application Serial No.: not yet assigned  
Applicant(s): Hsu et al.

**PATENT APPLICATION**  
Docket No.: N.C. 83,661

**Remarks**

Claims 18 through 28 presently appear in this case. Claims 1 through 17 have been deleted from the previous application as drawn to a non-elected invention. A request to add claims 18 through 28 is included in this preliminary amendment.

The changes to the Specification were to amend the title, reference the parent application, and make changes that had occurred during the prosecution of the parent application. One change that had occurred during the prosecution of the parent was to correct a typographical error. The solid particle precursor has a particle size range from 2 to 10,000 nm, not 2 to 100 nm. The support for this range is found in Claim 6 as originally filed. Another change that had occurred during the prosecution of the parent was to include a phosphor screen, or a detector for x-ray or charged particles. This amendment is supported by Claims 13, 15 and 17 as originally filed.

A favorable action at the Examiner's earliest convenience is earnestly solicited.

No issue of new matter or lack of adequate written description should arise as a result of the entry of the above amendment.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached page is captioned "Version with markings to show changes made."

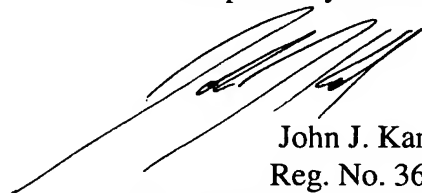
Application Serial No.: not yet assigned  
Applicant(s): Hsu et al.

**PATENT APPLICATION**  
Docket No.: N.C. 83,661

Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account  
No. 50-0281.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



John J. Karasek  
Reg. No. 36,182  
Naval Research Laboratory  
(202) 767-3427

Prepared by:  
Stephen Thomas Hunnius  
Reg. No. 48,304  
Naval Research Laboratory  
Code 1008.2  
4555 Overlook Ave., SW  
Washington, DC 20375  
(202) 404-1558  
(202) 767-3427

2030E0" 0E90600T

Version with markings to show changes made

In the Specification:

Please amend the Title as follows:

METHOD FOR PREPARING EFFICIENT LOW VOLTAGE PHOSPHORS-AND  
PRODUCTS PRODUCED THEREBY

Please insert on page 1, after the Title of the invention, the following:

This is a divisional application of copending United States patent application 09/531,159, inventors Hsu et al., filed March 17, 2000, the entirety of which is herein incorporated by reference.

Please amend the paragraph on page 10, beginning at line 14 to read:

After the solution containing at least the alkoxide precursor and the dopant precursor is provided, a solid particle precursor is then added. Typically, the solid particle precursor is nanoparticulate, although particles in the micron range may be used. ~~By the term~~ "nanoparticulate" and "nanoparticles," it is meant that the The particles have a greatest dimension of about ~~100~~ 10,000 nm or less, and should be as small in size as possible, preferably less than 10 nm. Typically, these nanoparticles may be silica, metal oxide, metal sulfide, metal oxysulfide, metal halide, metal carbonate, metal phosphate, metal sulfate, semiconductor-oxide (e.g., germanium oxide), pure metal or mixtures thereof. Specifically, silica such as fumed silica, V<sub>2</sub>O<sub>5</sub>, Y<sub>2</sub>S<sub>3</sub>, GdOS<sub>2</sub>, ZnO, GdS<sub>3</sub>, La<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, CdS, and the like may be used. With respect to silica, AEROSIL<sup>®</sup> fumed silica from Degussa Corporation can be used. The amount of solid

particle precursor usually is close to the stoichiometric amount determined by the phosphor compound, although the proportions for optimal light output are to be adjusted (or fine-tuned) empirically. Obviously, if the proportions are too far off, the desired phosphor compound and crystal structure cannot be formed properly.

Please amend the paragraph on page 5, beginning at line 7 to read:

It is also an object of the present invention to provide a method for preparing phosphors (e.g., orthosilicate phosphors) particularly adapted for use in low voltage operation (e.g., less than 5 kV) in applications such as flat panel displays, field emitter displays (FEDs), plasma displays, phosphor components for electroluminescent displays (ELDs), screens for TVs, field emission and plasma displays that do not have conventional screens (i.e., luminescent components built into or on the substrate), x-ray imaging displays (in lieu of photographic plates), a phosphor screen, or a detector for x-ray or charged particles, and the like.